Installing SRM-F and FRE/FRE-2 Processor Modules in BN Platforms

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Bay Networks

Bay Networks

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Electromagnetic Emissions

Meets requirements of:

FCC Part 15, Class A
EN 55 022 (CISPR 22:1985), Class A <and Class B>
VCCI Class 1 ITE

Canada Requirements Only

Canada CS-03 Rules and Regulations

Note: The Canadian Department of Communications label identifies certified equipment. The certification means that the equipment meets certain telecommunications network protective operations and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent the degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Canada CS-03 -- Règles et règlements

Note: L’étiquette du ministère des Communications du Canada indique que l’appareillage est certifié, c’est-à-dire qu’il respecte certaines exigences de sécurité et de fonctionnement visant les réseaux de télécommunications. Le ministère ne garantit pas que l’appareillage fonctionnera à la satisfaction de l’utilisateur.

Avant d’installer l’appareillage, s’assurer qu’il peut être branché aux installations du service de télécommunications local. L’appareillage doit aussi être raccordé selon des méthodes acceptées. Dans certains cas, le câblage interne du service de télécommunications utilisé pour une ligne individuelle peut être allongé au moyen d’un connecteur certifié (prolongateur téléphonique). Le client doit toutefois prendre note qu’une telle installation n’assure pas un service parfait en tout temps.

Les réparations de l’appareillage certifié devraient être confiées à un service d’entretien canadien désigné par le fournisseur. En cas de réparation ou de modification effectuées par l’utilisateur ou de mauvais fonctionnement de l’appareillage, le service de télécommunications peut demander le débranchment de l’appareillage.

Pour leur propre sécurité, les utilisateurs devraient s’assurer que les mises à la terre des lignes de distribution d’électricité, des lignes téléphoniques et de la tuyauterie métallique interne sont raccordées ensemble. Cette mesure de sécurité est particulièrement importante en milieu rural.

Attention: Les utilisateurs ne doivent pas procéder à ces raccordements eux-mêmes mais doivent plutôt faire appel aux pouvoirs de réglementation en cause ou à un électricien, selon le cas.

Canada Requirements Only *(continued)*

D. O. C. Explanatory Notes: Equipment Attachment Limitations

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Notes explicatives du ministère des Communications: limites visant les accessoires

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Canada Requirements Only *(continued)*

Canadian Department of Communications Radio Interference Regulations

This digital apparatus (Access Feeder Node, Access Link Node, Access Node, Access Stack Node, Backbone Concentrator Node, Backbone Concentrator Node Switch, Backbone Link Node, Backbone Link Node Switch, Concentrator Node, Feeder Node, Link Node) does not exceed the Class A limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

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Cet appareil numérique (Access Feeder Node, Access Link Node, Access Node, Access Stack Node, Backbone Concentrator Node, Backbone Concentrator Node Switch, Backbone Link Node, Backbone Link Node Switch, Concentrator Node, Feeder Node, Link Node) respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Réglement sur le brouillage radioélectrique du ministère des Communications du Canada.

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Contents

Tables

About This Guide

Read this guide if you are responsible for installing a System Resource Module-Front (SRM-F), Fast Routing Engine (FRE®), or FRE-2 processor module in these Backbone Node (BN®) platforms:

- Backbone Link Node (BLN®)
- Backbone Link Node-2 (BLN-2)
- Backbone Concentrator Node (BCN®)

This guide describes how to

- Install the processor module
- Use the switches and LEDs on the module

Note: Experienced network operators can safely perform the user-serviceable procedures described in this book; however, only authorized Bay Networks® service technicians can perform other maintenance procedures, not described in this book.

Conventions

bold text	Indicates text that you need to enter and command names in text. Example: Use the **dinfo** command.
italic text	Indicates variable values in command syntax descriptions, new terms, file and directory names, and book titles.
quotation marks (“ ”)	Indicate the title of a chapter or section within a book.

Acronyms

EMC	electromagnetic compatibility
FRE	Fast Routing Engine
GAME	Gate Access Management Entity
HDCM	Harpoon Diagnostic Console Monitor
ILI	Intelligent Link Interface
LED	light-emitting diode
SRM-F	System Resource Module-Front

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Chapter 1
Installing the Processor Module

Note: In this guide, the term processor module includes the FRE, FRE-2, and SRM-F processor modules, unless referring to a specific model.

Complete these tasks as needed to install the processor module:

1. Remove the front bezel of your BN platform.
2. Remove the electromagnetic compatibility (EMC) shield from the front panel to access the interior.
3. Choose a slot.
4. Remove the board retainer bracket (BLN and BLN-2 only).
5. Remove the air flow module (unless the slot you want to use already contains a processor module).
6. Remove a processor module (unless the slot you want to use is does not already contain a processor module, in which case you must remove the air flow module).
7. Insert the processor module into your BN platform.

Depending on your BN platform, you need a Phillips or flathead screwdriver to complete the steps in this chapter.

Note: There are no *user-configurable* jumpers on the processor modules. Changing any jumper settings on these modules can jeopardize module functioning.

The BN hot-swap feature allows you to install and remove processor modules with the power on or off.

Danger: A potential energy hazard exists during hot-swap service of processor modules. Do *not* remove more than two adjacent modules without powering off the BN platform.

Removing the Front Bezel

You must remove the front bezel (front cover) of BLN, BLN-2, and BCN platforms to access their interiors.

Note: Keep the front bezel on during normal operation to comply with air flow requirements.

To remove the front bezel from the BLN (Figure 1-1) and BLN-2 (Figure 1-2):

1. **Using both hands, pull the bottom of the front bezel forward.**
2. **Remove the bezel from the chassis.**

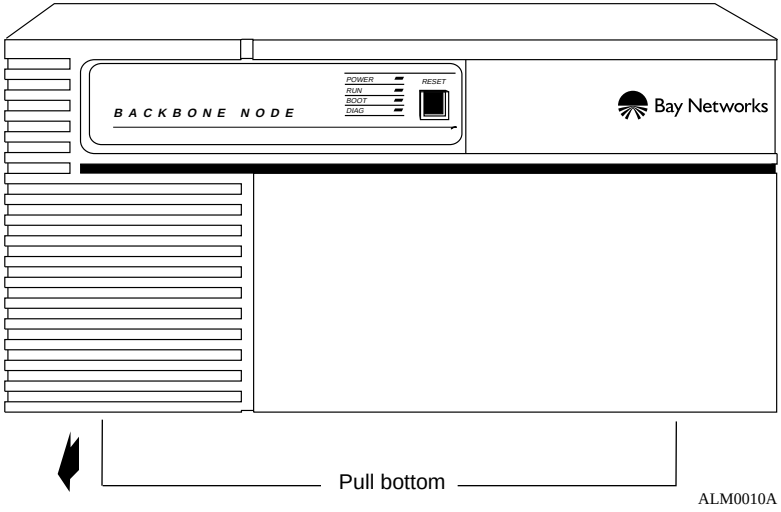

Figure 1-1. Removing the BLN Front Bezel

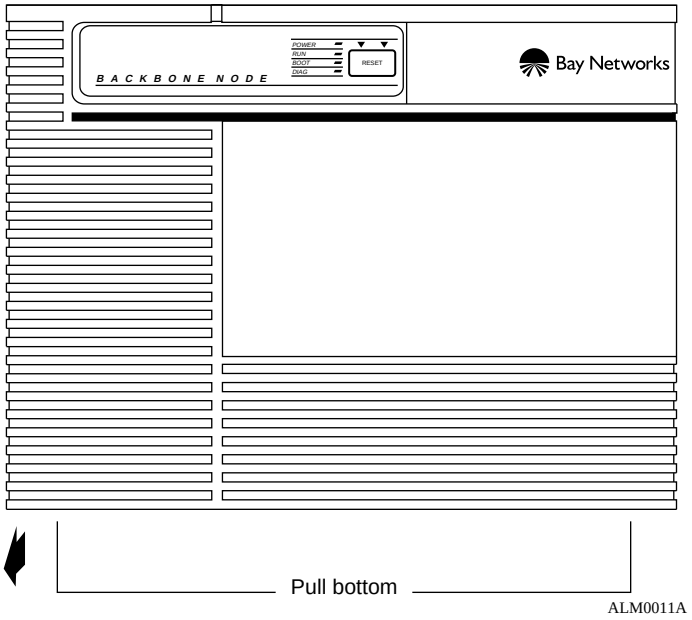

Figure 1-2. Removing the BLN-2 Front Bezel

To remove the front bezel from the BCN (Figure 1-3):

1. **Using both hands, pull the top of the front bezel forward.**
2. **Remove the bezel from the chassis.**

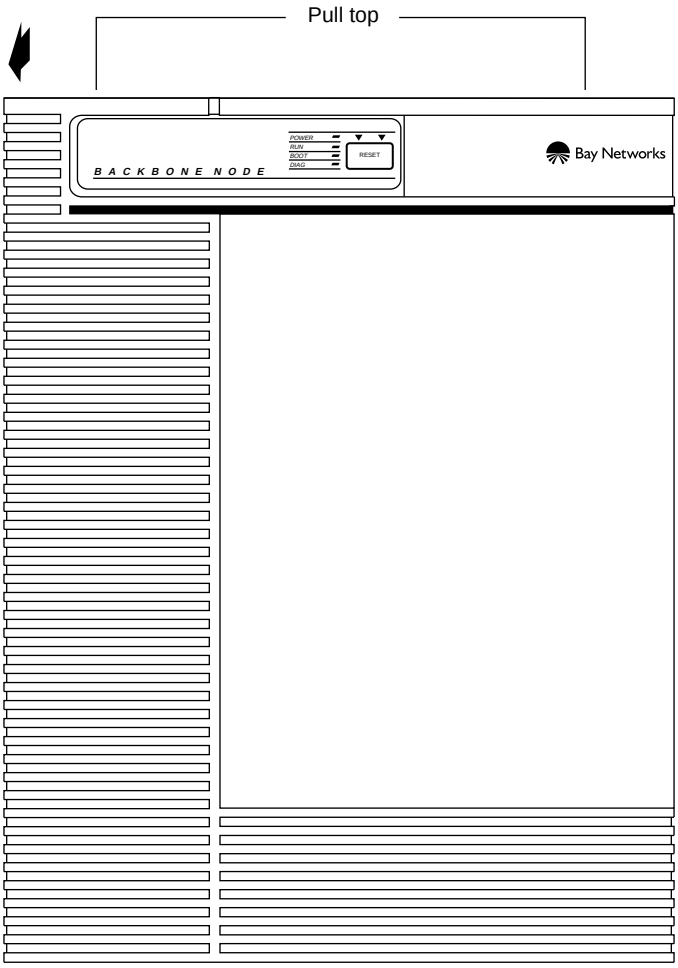

Figure 1-3. Removing the Front Bezel from the BCN

Removing the EMC Shield

You must remove the EMC shield to access the slots for processor modules in BN platforms.

Caution: Do not operate a BN platform with the EMC shield removed for more than 5 minutes. Without the EMC shield, the BN platform may overheat. In addition, the BCN contains temperature sensors that may not detect an overheating condition without the shield in place.

To remove the EMC shield (Figure 1-4):

1. **Attach an antistatic wrist strap.**

   BN platforms and link modules ship with an antistatic wrist strap. You must wear one of these straps whenever you access components in a platform.

   The antistatic wrist strap directs the discharge of static electricity from your body to the chassis, thereby avoiding discharge and possible damage to sensitive electronic components.

Caution: Electrostatic discharge can damage hardware. Always use the antistatic wrist strap when handling any component in your BN platform.

2. **Loosen the captive thumbscrews that fasten the EMC shield to the chassis.**
3. **Remove the EMC shield from the chassis.**

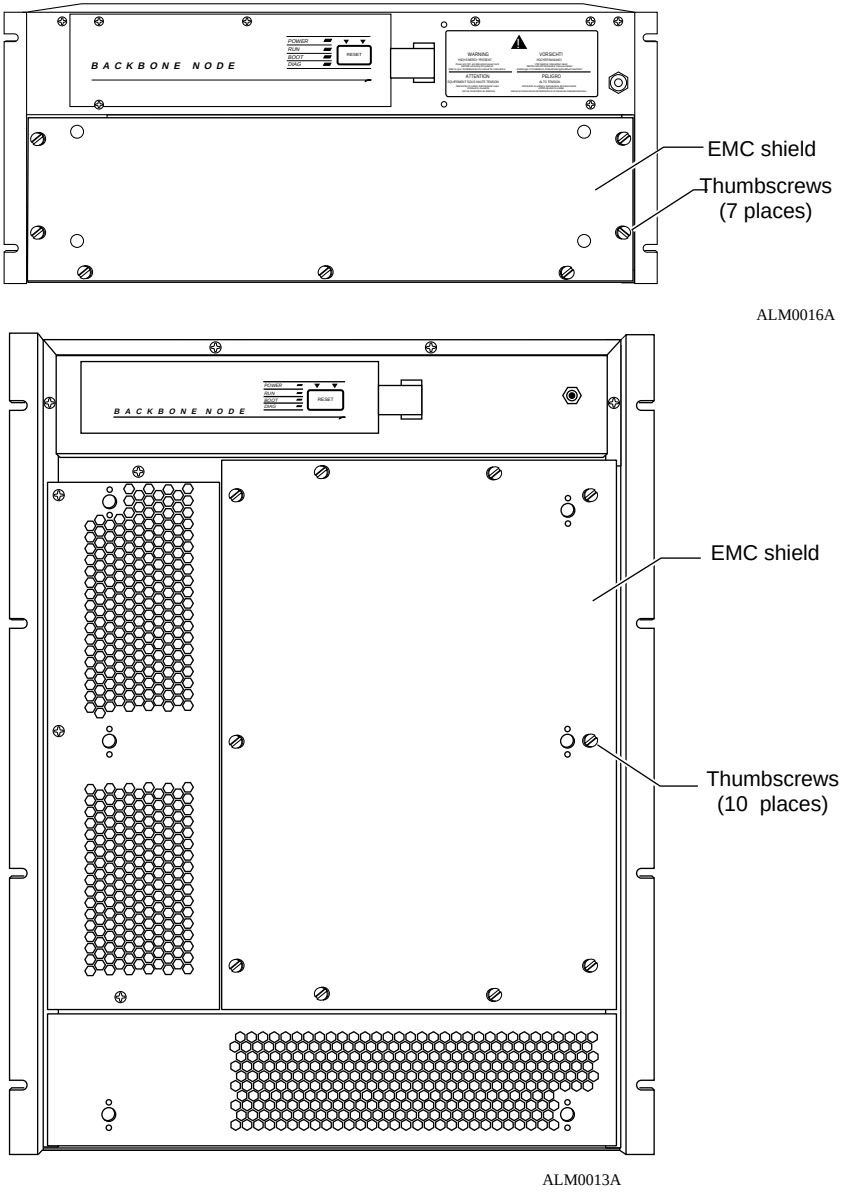

Figure 1-4. BLN and BCN EMC Shields

Choosing a Slot

You can install a FRE or FRE-2 processor module in

- Slots 2 through 5 in the BLN platform (Figure 1-5)
- Slots 2 through 5 in the BLN-2 platform (Figure 1-6)
- Slots 1 through 6 and Slots 8 through 14 in the BCN platform (Figure 1-7)

You can install an SRM-F only in Slot 1 (the bottom slot) in the BLN (Figure 1-5) and BLN-2 (Figure 1-6) and only in Slot 7 in the BCN (Figure 1-7).

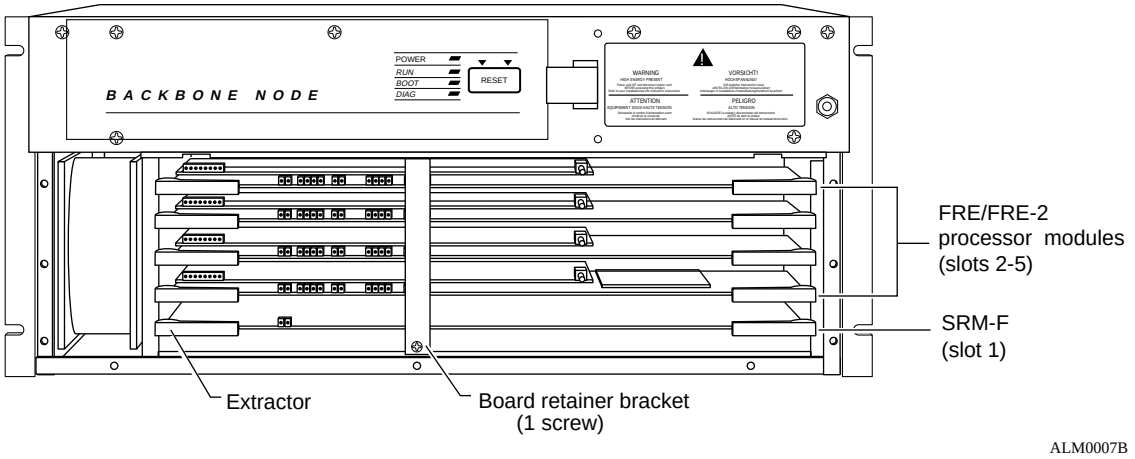

Figure 1-5. Location of Processor Modules and the SRM-F in a BLN Platform

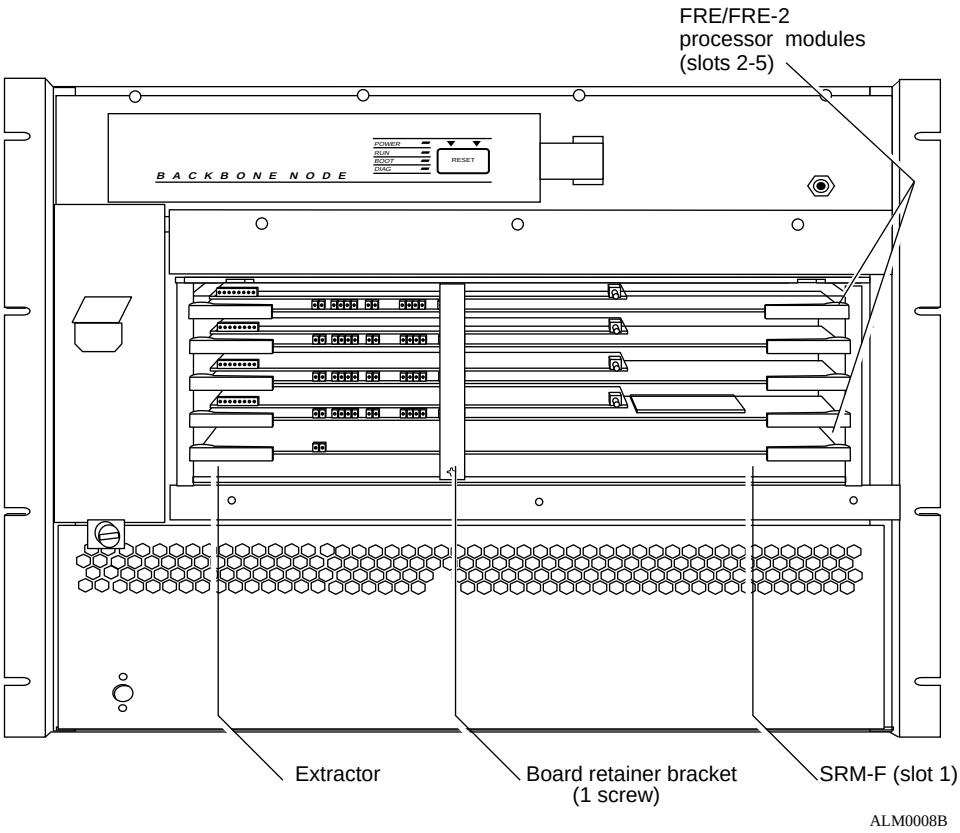

Figure 1-6. Location of Processor Modules and the SRM-F in a BLN-2 Platform

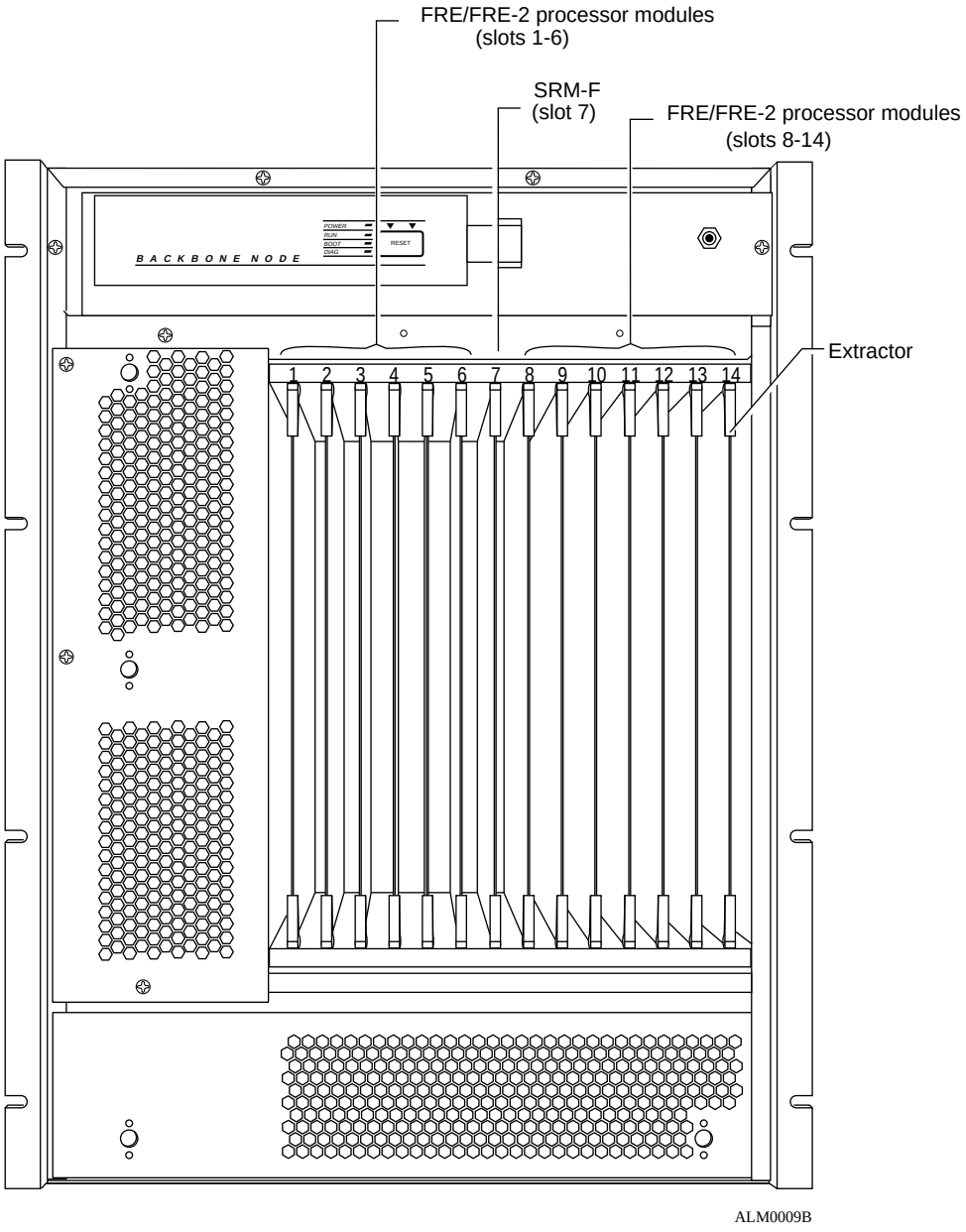

Figure 1-7. Location of Processor Modules and the SRM-F in a BCN

Removing the Board Retainer Bracket (BLN and BLN-2 Only)

If you have a BLN or BLN-2 platform, remove the board retainer bracket shown earlier in Figure 1-5 (BLN) and Figure 1-6 (BLN-2):

1. **Use a screwdriver to remove the screw connecting the board retainer bracket to the chassis.**
2. **Gently pull the bottom of the board retainer bracket to remove it.**

Removing an Air Flow Module

Bay Networks ships an air flow module in each empty processor module slot in the front of all BN platforms. Each air flow module redirects cool air to the adjacent processor module.

Figure 1-8 shows the location of an air flow module. If the slot in which you want to install the processor module contains an air flow module, you must first remove the air flow module from that slot. If the slot you want to use already contains a processor module, refer to the next section, “Removing a Processor Module.”

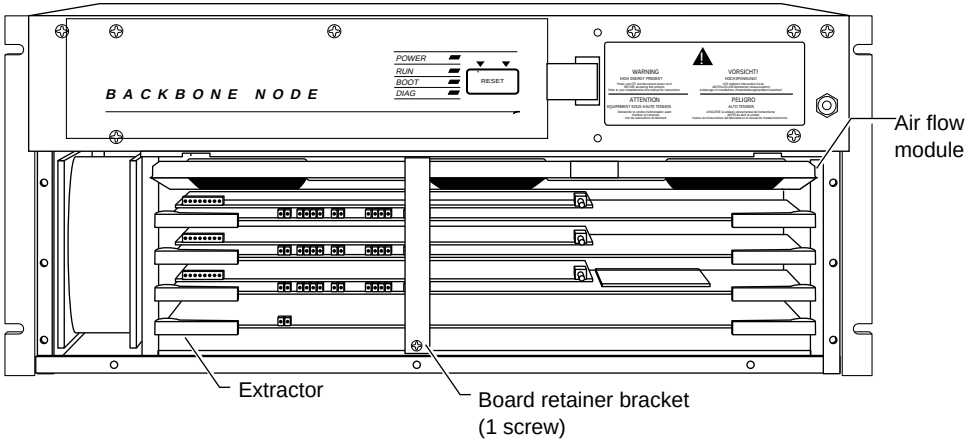

Figure 1-8. Air Flow Module in a BN Platform

Pull the front of the air flow module forward to remove it (Figure 1-9).

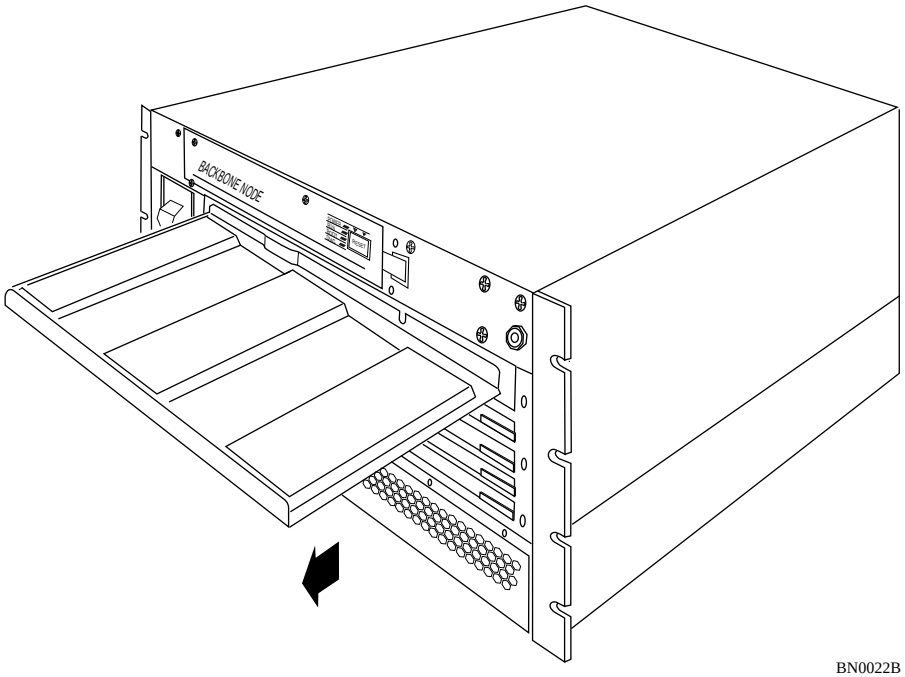

Figure 1-9. Removing an Air Flow Module

Removing a Processor Module

When removing a processor module, keep the following in mind:

- When you remove a FRE module, connections to the slot in question and the services that slot provides become disrupted. The other FRE modules resynchronize their routing tables after the slot fails to receive packets.
- The SRM-F and SRM-L (System Resource Module-Link) each supply two backbones. This means two backbones become inactive if you remove one of these modules, and four backbones become inactive if you remove both. When you insert one module, its associated backbones become active. For more information on the SRM-L, refer to *Installing and Maintaining BN Routers*.

To remove a processor module:

1. **Gently pull the inside of the board extractors at each end of the module toward you (Figure 1-10).**

   The extractors swing open, pushing the module out of the backplane connectors.

2. **Place the module in an antistatic protective bag.**

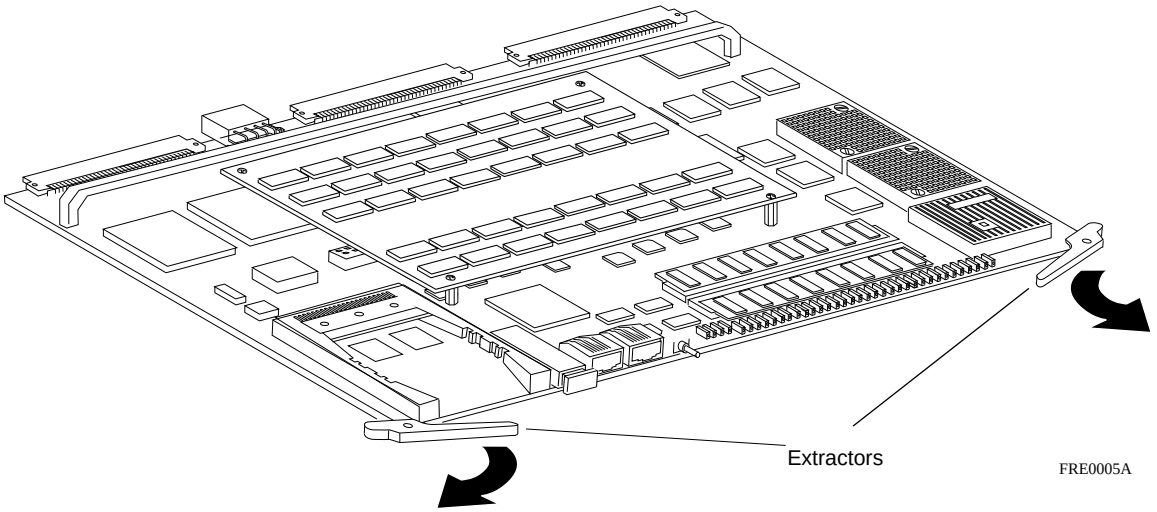

Figure 1-10. Using the Extractors to Remove a Processor Module

Inserting the Processor Module

Insert a processor module as follows:

1. **If the processor module has a power switch, make sure the switch is in the On position; that is, the switch is to the right (Figure 1-11).**

   If your FRE or SRM-F does not have a power switch, the module powers on automatically when you connect it.

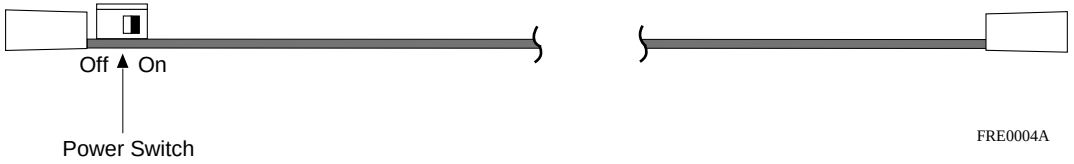

Figure 1-11. Location of Power Switch on FRE Module and SRM-F

2. **Holding the board extractors open, slide the module into the card guides of the desired slot.**

   When inserting a module into a BLN or BLN-2, lift the middle of the board slightly and push it gently to ensure that the connector in the middle of the board engages.

3. **Swing the extractors forward to lock the board in place.**

Note: If the extractors do not lock into place easily, remove the module and repeat Steps 2 and 3.

When you insert the processor module into a slot, and the module determines that slot power is stable, the module automatically

- Executes the diagnostics image on its memory card
- Completes the boot process

4. **Observe the module and front-panel LEDs to determine whether the FRE/FRE-2 module or SRM-F is functioning properly.**

   Following is a brief description of the LED activation sequence after you insert a new FRE/FRE-2 or SRM-F module. (See Chapter 2 for a complete description of LEDs.)

   - When you insert a FRE/FRE-2 module, the DIAG LED turns on during diagnostics and then turns off if diagnostics determine that the FRE/FRE-2 is functional. If the DIAG LED does not turn off, contact the Bay Networks Technical Response Center.

- If diagnostics determine that the FRE/FRE-2 is not functional, the DIAG LED on the front panel and LED 8 on the FRE/FRE-2 module remain on. If this occurs, make sure the modules seat properly in the BN platform and issue the **diags** command using the Bay Networks Technician Interface.
- If diagnostics determine that the FRE/FRE-2 is functional and a link module connects to the FRE/FRE-2, the BN platform also performs diagnostics on the link module.

  Regardless of the results of the link module diagnostics, the BOOT LED turns on, indicating that the FRE/FRE-2 is booting. If the link module or any of its ports do not function, the link module Fail LED turns on.

5. **If you just installed the processor module in a BLN or BLN-2, replace the board retainer bracket:**
   a. **Slide the top of the board retainer bracket into its designated ridge and align the bottom of the bracket with the screw hole at the bottom of the chassis (Figure 1-5 or Figure 1-6).**
   b. **Use a screwdriver to secure the bracket to the chassis.**
6. **Replace the EMC shield as follows:**
   a. **Position the EMC shield in front of the chassis.**
   b. **Tighten the captive thumbscrews that fasten the EMC shield to the chassis.**

   Refer to Figure 1-4.
7. **Remove the antistatic wrist strap.**
8. **Replace the front bezel as follows:**
   a. **Align the mounting retainers on the inside of the bezel with the holes on the front of the EMC shield.**
   b. **Push the sides of the bezel into place.**

   Refer to Figure 1-1 (BLN), Figure 1-2 (BLN-2), or Figure 1-3 (BCN).

Chapter 2
Using Switches and LEDs

This chapter describes the switches and status indicator lights (LEDs) on the SRM-F and FRE/FRE-2 modules. Use the LEDs to verify that the module is operating after installation.

SRM-F Switch and LEDs

The front edge of the SRM-F module has two LEDs (A and B). This module may also have a power switch (Figure 2-1).

Note: The power switch is installed on some SRM-F modules. If the SRM-F has a power switch, it must remain set to the right, in the On position.

Figure 2-1. SRM-F LEDs

LED A, when on, indicates that 5 volts are available to the SRM-F.

LED B, when on, indicates that the board is held in reset due to a hardware failure. Contact the Bay Networks Technical Response Center.

FRE Module Switch and LEDs

The front edge of each FRE module has several status LEDs, an HDCM (Harpoon Diagnostic Console Monitor) button, and a Flash memory card ejector (Figure 2-2). This module may also have a power switch.

Note: The power switch is installed on some FRE modules. If the FRE module has a power switch, it must remain set to the right, in the On position.

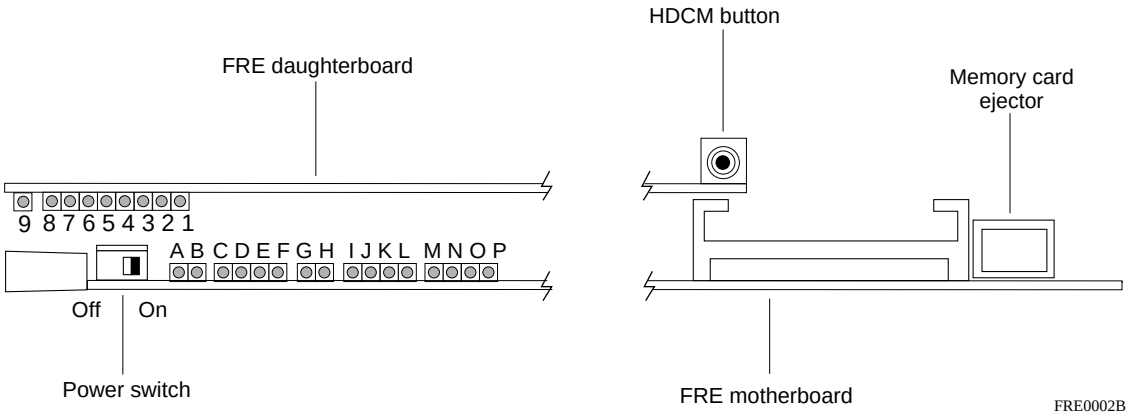

Figure 2-2. FRE Module LEDs

LEDs 1 through 9 and the HDCM button reside on the daughterboard.

Table 2-1 describes the meaning of LEDs 1 through 8 during diagnostic testing.

Table 2-1. Meaning of FRE LEDs 1 through 8 During Diagnostics

LED	Meaning
1 to 7	These LEDs display a code that reveals the diagnostic test under execution. The diagnostic test number is represented in hexadecimal notation. When on, LEDs indicate 1s; when off, LEDs indicate 0s.
8	Diagnostic testing is in progress.

Table 2-2 describes the meaning of LEDs 1 through 8 when LED F is also on (LED F turns on when the GAME operating system executes).

Table 2-2. Meaning of FRE LEDs 1 through 8 when LED F is On

LED	Meaning
1 to 6	The least significant digits of the second counter expressed in binary. The counter updates each second. (During a boot, these LEDs flicker rapidly.)
7	The slot is running the Technician Interface. (Only one slot runs the Technician Interface at a time.)
8	The FRE module is booting (or resetting) and PROM read/write protection is disabled. This LED also turns on during the execution of the Technician Interface **prom -w** (write) command, which updates a PROM.

LED 9 turns on whenever the CPU receives a **reset** command.

The HDCM button has three functions:

- Establishing an HDCM session (when pressed for less than 1 second and released). The HDCM session is for Bay Networks Customer Service personnel only.
- Cold-starting the FRE module (when you press it for more than 1 second and release, regardless of whether an HDCM session is running).
- Warm-starting the FRE module (when an HDCM session is running and you press it for less than 1 second and release).

LEDs A through P, the power switch, and the Flash memory card ejector reside on the motherboard. Table 2-3 describes the meaning of the LEDs when on, and Table 2-4 lists the diagnostic codes.

Table 2-3. Meaning of FRE LEDs A through P

LED	Meaning
A	The PPX (Parallel Packet Express) is held in reset due to a hardware or software error. This LED also flashes briefly when the FRE is reinitialized or reset.
B	The PPX DMA logic is accessing the DRAM (dynamic random-access memory).
C, D	These LEDs display a code that reveals the diagnostic test under execution (refer to Table 2-4).
E	Diagnostics code execution is in progress.
F	The GAME operating system is executing.
G	The CPU is accessing the DRAM.
H	The hardware is resetting.
I	The FRE module is transmitting on PPX A.
J	The FRE module is transmitting on PPX B.
K	The FRE module is transmitting on PPX C.
L	The FRE module is transmitting on PPX D.
M	The FRE module is flow-controlling on PPX A.
N	The FRE module is flow-controlling on PPX B.
O	The FRE module is flow-controlling on PPX C.
P	The FRE module is flow-controlling on PPX D.

Table 2-4. Diagnostic Codes

C LED	D LED	E LED	Diagnostic Test in Progress
ON	ON	ON	CPU
OFF	ON	ON	Backbone
ON	OFF	ON	Link module
OFF	OFF	ON	HDCM

FRE-2 Module Switch and LEDs

The front edge of each FRE-2 module has several status LEDs, an HDCM (Harpoon Diagnostic Console Monitor) button, and a memory card ejector (Figure 2-3). This module also has a power switch.

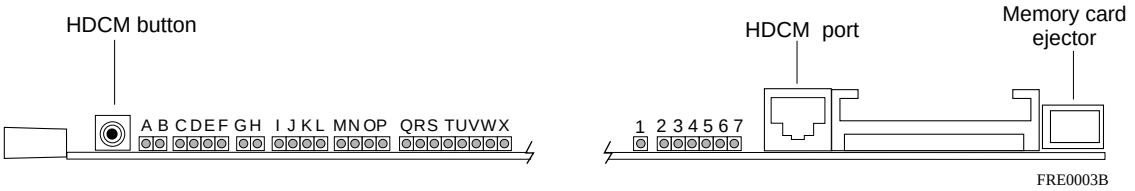

Figure 2-3. FRE-2 Module LEDs

Table 2-5 describes the meaning of LEDs 1 through 7.

Table 2-5. Meaning of FRE-2 LEDs 1 through 7

LED	Meaning
1	The slot is running the Technician Interface.
2, 3, 4	The link module interface is requesting access to DRAM.
5	The link module interface is accessing DRAM.
6, 7	Provides internal state information for the link module interface.

The HDCM button has three functions:

- Establishing an HDCM session (when pressed for less than 1 second and released). The HDCM session is for Bay Networks Customer Service personnel only.
- Cold-starting the FRE-2 module (when you press it for more than 1 second and release, regardless of whether an HDCM session is running).
- Warm-starting the FRE-2 module (when an HDCM session is running and you press it for less than 1 second and release).

Table 2-6 describes the meaning of LEDs A through P when on.

Table 2-6. Meaning of FRE-2 LEDs A through P

LED	Meaning
A	The PPX (Parallel Packet Express) is held in reset due to a hardware or software error. This LED also flashes briefly when the FRE-2 is reinitialized or reset.
B	The PPX DMA logic is accessing the DRAM (dynamic random-access memory).
C, D	These LEDs display a code that reveals the diagnostic test under execution (refer to Table 2-4).
E	Diagnostics code execution is in progress.
F	The GAME operating system is executing.
G	The CPU is accessing the DRAM.
H	The hardware is resetting.
I	The FRE-2 module is transmitting on PPX A.
J	The FRE-2 module is transmitting on PPX B.
K	The FRE-2 module is transmitting on PPX C.
L	The FRE-2 module is transmitting on PPX D.
M	The FRE-2 module is flow-controlling on PPX A.
N	The FRE-2 module is flow-controlling on PPX B.
O	The FRE-2 module is flow-controlling on PPX C.
P	The FRE-2 module is flow-controlling on PPX D.

LEDs Q through X indicate that the diagnostic test number shown is executing. The diagnostic test number is represented in hexadecimal notation. When on, LEDs indicate 1s; when off, LEDs indicate 0s.

Table 2-7 describes the meaning of LEDs Q through X when LED F is also on (LED F turns on when the GAME operating system executes).

Table 2-7. Meaning of FRE-2 LEDs Q through X when F is On

LED	Meaning
Q	The FRE-2 processor module is booting (or resetting) and PROM read/write protection is disabled. This LED also turns on during the execution of the Technician Interface **prom -w** (write) command, which updates a PROM.
R	The slot is running the Technician Interface (only one slot can run the Technician Interface at a time).
S, T, U, V, W, X	Indicates the least significant digits of the second counter expressed in binary. The counter updates every second.